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Ornamental WEED Control

Properly identifying weeds, selecting an effective means of control and applying it at the proper time can keep weed populations at manageable levels.

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eed control is an essential component of landscape and nursery crop management and sales. The seemingly endless array of weeds that germinate in unwanted areas provide shelter for insect pests; interfere with air circulation, harboring moisture to enhance the environment for disease organisms; compete for water and nutrients; and decrease the value of the product. Invasive or noxious weeds may interfere with sales or shipping of stock.



Japanese knotweed is a tall-growing perennial with hollow stems. Its extensive rhizomes are difficult to eradicate. Herbicide applications to young plants often do not kill the rhizomes, so more mature plants are usually targeted.

Failure to control weeds can be frustrating, especially if the same weeds keep coming back to mock all attempts at their eradication. Repeated failure in controlling weed populations is often a sign that cleaning out one population does not solve the long-term problem. A more detailed knowledge of weeds and tactical plan for control are often all that is needed to win the war of the weeds.

ID is key. One of the common errors leading to weed-control failure is improper identification of the weeds present. Weeds can be classified as perennials, summer or winter annuals, broadleaf or grasses, as well as sedges and rushes. These classes are further enhanced as annual grasses, broadleaf perennials, and so on. Each class of weed has its own challenges in proper timing and selection of control methods. Also, some herbicides are more effective on certain weeds than others. Correctly identifying the weed is the first step to successful control.

Books and pictorial guides to weed identification are the most common methods of identifying weeds. Dichotomous keys are also available. These take the form of a series of yes and no questions that narrow down the possibilities until a positive identification is made. For those of you who have trouble using dichotomous keys, rest assured that just looking at the photos can be equally useful.

There are many online and hardcopy resources available for weed identification. Local growers, botanical gardens and your state's extension service can refer you to publications pertinent to your area of the country. If you have an idea of the type of weed you have, online searches can help check the correctness of the identification. Invasive weed lists are maintained online at the USDA National Invasive Species Information Center Web site, www.invasivespeciesinfo.gov. Many of the resources are pictorial guides — matching the picture or line drawing to a sample. Proper identification allows you to gain information about the life cycle of the weed, as well as methods and timing of control.

Life cycles. Recognizing and understanding life cycles of weeds are essential to proper timing of control measures. Cultivation or use of herbicides at the wrong time will fail to control the weed, as well as waste time and money, and may even make the weed problem worse.

Perennial weeds die down during winter and resprout from a persistent vegetative structure, such as a crown or rhizome. In order to be effective, weed control must

The Canada thistle on the left is a perennial, which is difficult to control. It readily resprouts from deep rhizomes, and many herbicides will not kill the entire plant in one application. The *Sonchus asper* (spiny sow thistle) in the middle is a summer annual that can be controlled with pre-emergent herbicides/mulches, broadleaf herbicides or cultivation. The common dandelion on the right is a deep-rooted perennial that will resprout after cultivation, but is killed by systemic herbicides.



destroy the entire plant, including this persistent vegetative structure. Extensive, underground portions of some perennial weeds make them very difficult to control. Herbicide applications and cultivation often do not kill the entire plant, and the weed resprouts from the remaining parts.

Cirsium arvense (Canada thistle), *Polygonum cuspidatum* (Japanese knotweed) and *Convolvulus arvensis* (field bindweed) are all perennial weeds with stolons or rhizomes that often resprout after cultivation or an herbicide application. This resprouting is because the plant may be killed before the herbicide is translocated through the entire root system, or the plant may not have taken in enough of the product to kill the entire underground portion of the plant. On the other hand, *Taraxacum officinale* (common dandelion) is more easily controlled with a single herbicide application, though it can resprout if mechanical controls are used and the entire taproot is not removed.

For this same reason, burndown herbicides are not effective against perennial weeds, as these products do not destroy the persistent root or crown. Continual, multiple applications would be required to starve the root system. Seedlings of perennial weeds can be controlled with turndowns if they are treated before the weeds form a persistent rhizome, stolon or crown.

Unlike perennial weeds, annual weeds die back completely each year and rely on seed to produce each successive generation. These weeds are further divided into summer annuals and winter annuals. Each classification refers to the season in which the weed normally completes its life cycle. However, germination occurs earlier in the year, and many attempts at controlling annual weeds fail because the plants are usually producing seed by that time.

For instance, *Poa annua* (annual bluegrass) is a winter annual that grows into a bright green carpet in thin areas of turf, along or in walks and in areas of bare soil. By the time spring weather arrives, this weed has already populated baseball diamonds and landscapes. Burndown and

Even after an herbicide application, some weeds continue to produce a crop of seed for the next generation.





nonselective herbicides will easily control annual bluegrass at this time, but the plant has usually produced seed heads. Though the plant dies, seed has already been dropped to guarantee next year's crop. The result is a yearly and often escalating battle with the same herbaceous pest.

Summer annuals, such as *Portulaca oleracea* (purslane) and *Polygonum arenastrum* (common knotweed), germinate as soils warm in the spring. They produce their seed crops throughout the summer. Control of these weeds also must be completed before the plants set seed for next year's crop.

Weed-control choices. The wide variety of weeds and life cycles makes it unfeasible to control all weeds with a single approach. The type of control method selected should be determined by the types of weed to be managed and the crop or area in which it occurs.

Preparation of the area prior to planting can aid in management of many weeds. Clean cultivation and use of nonselective herbicides prior to planting can rid beds of existing perennial and annual weeds before they become a persistent problem. However, seed will remain dormant in the soil for many years and germinate as conditions permit. This "seed bank" will be the source of continual weed problems for several seasons.

Deposits are made into the bank when weeds are allowed to go to seed. Some weeds will continue to ripen and distribute seed even after herbicides are applied or after being removed through cultivation. If hand-pulled, weeds should be removed completely from that area. Seed is removed from the seed bank only when it

germinates or dies. Every generation of weed seed that is controlled before it can redeposit seed reduces the overall weed pressure in the area. You may never break the seed bank, but you can reduce the population it produces each year.

One last word on preparation: If you are bringing in soil or organic matter, make sure you know its source. Weed-laden soils or amendments can be a source of terrible weed problems and introduce invasive, noxious weeds into the area.

Mechanical control, such as cultivation or hand-pulling, is effective at controlling germinating seed and annual weeds. Established perennial weeds may resprout from roots, rhizomes or tubers that were not completely removed or destroyed by cultivation. If the weeds have begun to flower or produce seed, cultivation will mow down existing plants, but seed will still be distributed for future crops of weeds. Timely cultivation before the plant flowers will effectively remove weed cover and prevent seed production. Another side effect of cultivation is that it tends to bring seed from the seed bank to the surface, where it can be stimulated to germinate.

Mulches take on many forms and control weed growth by creating a barrier to germination and subsequent growth of seedlings. Plastic or fabric mulch can be placed in overlapping patterns to prevent light from reaching the soil, with a thin layer of organic or inorganic mulch layered on top. These top layers of organic mulches can support some weed growth, and inorganic mulches can accumulate organic matter over time, providing areas for seed to germinate. However, a mulched area is far easier to keep clean than weedy soil. Avoid the temptation to



This young purslane, a summer annual, will begin to flower within one or two weeks, but can be successfully controlled at this stage.

overmulch. Excessive mulch can reduce water penetration to underlying soil, damage crowns of perennials and encourage adventitious root growth from trunks of woody plants. In the Midwest, 2 or 3 inches of mulch is the maximum recommended depth. If yearly applications begin to build up, the old mulch should be removed before applying new layers. Mulches, in combination with pre-emergent herbicides, provide some of the best prevention of weed emergence.

Selection of herbicides is dependent upon the weed, crop and areas that need treatment. Read the label before selecting an herbicide to make sure it is appropriate for the application. Products may have limited uses for nursery, landscape or riparian areas. The label will also note any specific instructions regarding irrigation or incorporation of herbicides.

Selecting herbicides. Pre-emergent herbicides prevent seed from germinating and must be applied before germination begins. Essentially, they create an area in the top layer of soil that kills the seed before it completes germination. Dates will vary from state to state, but generally, targeting winter annuals will require applications in late summer or early fall. Summer annual control would require placement in early or midspring.

Cultivation prior to pre-emergent application allows for better penetration of the herbicide — creating a barrier through the top layer of soil. After application, irrigation or incorporation may be required to activate the herbicide. Any subsequent disturbance of the soil surface, such as from planting or equipment traffic, can break the herbicide barrier and allow seed germination. And re-

member, pre-emergent herbicides will not be effective against established perennial weeds.

Select pre-emergent herbicides that target the problem weeds. They can be used against grassy weeds, broadleaf weeds or both. For instance, products, such as oxyfluorfen (Goal) or oxadiazon (Ronstar), are better for broadleaf weed control, while trifluralin (Treflan) or oryzalin (Surflan) are better for grassy weeds.

Postemergent herbicides come into play for established perennial weeds or after annuals are up and growing. Burn-down types of postemergent herbicides, such as pelargonic acid (Scythe), are non-selective and will control annual weeds and some newly germinating perennial weeds. Systemic herbicides, on the other hand, enter the weed via leaves or roots and kill the entire plant, root and all. Non-selective systemic herbicides, such as glyphosate, are effective on both grasses and broadleaf weeds. Some herbicides specifically target broadleaf weeds and leave grasses untouched, while others control grasses and leave broadleaf weeds untouched.

Consult your local extension service and other experienced growers for assistance in selecting the herbicides for use in your area. The bulletin *Con trolling Weeds in Nursery and Landscape Plantings*, available at <http://ohioline.osu.edu/b867>, provides a comprehensive list of herbicides and a discussion of their uses.

With all herbicides, do not exceed the rates on the label, and take the time to calibrate all application equipment. Overapplication of herbicides is common. Aside from potential and severe crop damage, overapplication wastes resources and money. Clean all application equipment, replace worn spray nozzles that would tend to overapply the product, and train applicators to accurately apply the herbicide.

Weed control is not as simple as it would seem. A constant battle with particular weeds might be traced back to poorly timed control methods or misidentification of the weed itself. Properly identifying the weed, selecting an effective means of control and applying it at the proper time can improve your success rate. There will always be weeds; the goal is to keep the population at manageable and acceptable levels.

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Polygonum aviculare (prostrate knotweed) is a summer annual with narrow, blue-green leaves. It has a thin taproot, prefers poor-compacted soils and must grow from seed every year.